

REMARKS

In accordance with 37 CFR §1.116, applicant has narrowed the claims and issues for purposes of appeal and/or allowance and has incorporated portions of dependent Claim 2 into Claim 1 as amended.

These amendments do not add any new subject matter, for example, the disclosure of the insulation board and wiring pattern can be found in Paragraph 0144 and the disclosure of the reflecting member can be readily seen in Figures 3A and 3B of our drawings.

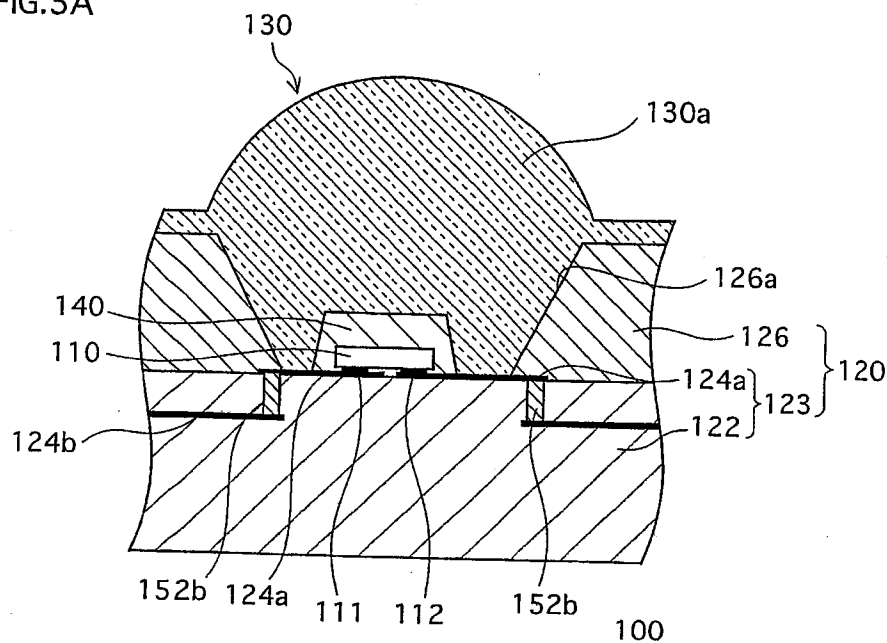
Likewise, the amendment to Claim 4 is supported by Paragraph 0087 and Figures 1, 2 and 3B. Finally, the amendment to Claim 5 is supported by Paragraphs 0088 and 0089 and Figure 5A.

The present invention, as defined in our current claims, provides an economical and low cost LED mounting module with a capacity to readily dissipate heat while maintaining a high light extraction efficiency.

Our wiring pattern can be formed entirely or partially on the main surface of the insulation board. When there are two or more insulation boards, a part of the wiring pattern may be formed on a main surface of a corresponding one of the insulation boards and another part of the wiring pattern may be formed on another part of the insulation board other than the main surface, as can be seen in the cross section of Figure 15, patterns 324 and 325.

The reflecting member as shown in Figures 3A and 3B can cover the wiring pattern as well as the insulation board. As a result, that portion of the wiring pattern, covered with the reflecting member, is prevented from being displaced from the insulation board. It is also protected from any damage from outside contact.

FIG.3A



Additionally, since the reflecting member is made of a resin material, it does not need to be further insulated and, therefore, can be applied efficiently and at a relatively low production cost.

Any heat from an LED device is transmitted from a reflecting member to the wiring pattern and, therefore, is dissipated. This can be contrasted with a circumstance wherein the reflecting member is adhered to the substrate with an adhesive therebetween and light emitted from the LED device in such a circumstance can be absorbed by the adhesive material.

Since the reflecting member and the insulation board can be made from the same resin material, it is possible to tightly adhere each of them together and they will have the same thermal expansion coefficient. As a result, any dislocation of the reflecting member from the insulation board due to any heat generated from each LED device may be suppressed when the LED device is activated.

When the wiring pattern is not formed on the main surface of the insulation board, it can be connected to the surface pattern through a via hole. The via hole can be located below the reflecting member, see Figure 15, reflecting board 326 and via holes 327. As a result, during the emission of light from the LED device, heat generated can be transmitted from the reflecting member to the via hole through the surface pattern and, therefore, can be readily dissipated.

Claim 1 had been rejected as completely anticipated by *Hashimoto et al.* (U.S. Patent No. 6,930,332). With the amendment of the current claims, we believe that this rejection is mooted.

Claims 1-14 were held to be unpatentable over a combination of *Ignatius et al.* (U.S. Patent No. 5,660,461) in view of *Shimizu et al.* (U.S. Patent Publication 2003/0189829).

The *Shimizu et al.* reference employs a card-type LED illumination source that could be replaced and mounted in a lighting fixture, for example as shown in Figure 20.

In the different embodiments such as the cross-sectional view in Figures 5(a) and 5(b), one or more insulation layers and wires were provided above a heat dissipating metal plate. The LED 2 could be encased in a plastic resin 4 and electrically connected through a via hole that is filled with a metal paste 1(f) that extends through the first insulating layer 1(c) as shown in Figure 5(b). Similar arrangements are disclosed in other configurations of the *Shimizu et al.* reference, such as Figure 14(a).

As can be readily determined, there is no teaching of a reflecting member with a lower surface portion directly adhered to part of the wiring pattern and with the remainder adhered to the insulation board.

The *Ignatius et al.* reference is directed to a low cost method of manufacturing an array of light emitting diodes in an inexpensive manner. Basically a series of U-shaped lead frame substrates have insulating material positioned on the substrates by molding to form a block and

an optoelectronic electrical device could be mounted directly onto the block lead frame with a reflector unit having individual reflectors positioned adjacent to each of the optoelectronic devices such as an LED. A series of individual reflectors, formed as a unit would have connectors for example of a dovetail projection and dovetail hole to permit an interconnection of an array of reflectors on the block lead frame, see Figures 4 and 5. Note, the lead frame is apparently made from copper, aluminum or nickel, Column 3, Line 1, and used as the electrical connection for the LED 34.

The lead wire and LED are then coated with an overcoat of a transparent passivation epoxy, see Column 5, Lines 21-25. The individual reflectors 44-52 are interconnected on the block lead frame and fastened by an epoxy adhesive or a double sided tape, Column 5, Lines 61-64.

It is submitted that neither reference teaches the present amended claims.

The *KSR* Court noted that obviousness cannot be proven merely by showing that the elements of a claimed device were known in the prior art; it must be shown that those of ordinary skill in the art would have had some “apparent reason to combine the known elements in the fashion claimed.”

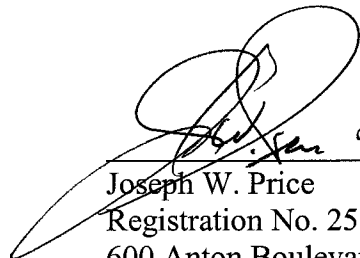
In the same way, when the prior art teaches away from the claimed solution as presented here, obviousness cannot be proven merely by showing that a known composition could have been modified by routine experimentation or solely on the expectation of success; it must be shown that those of ordinary skill in the art would have had some apparent reason to modify the known composition in a way that would result in the claimed composition.

Ex parte Whalen et al., Appeal 2007-4423, slip op. at 16 (B.P.A.I. July 23, 2008) (citing *KSR Int’l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1741 (2007)).

If the Examiner believes a telephone interview will help further the prosecution of this case, he can contact the undersigned attorney at the listed telephone number.

Very truly yours,

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